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United States
Department of
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Forest Service

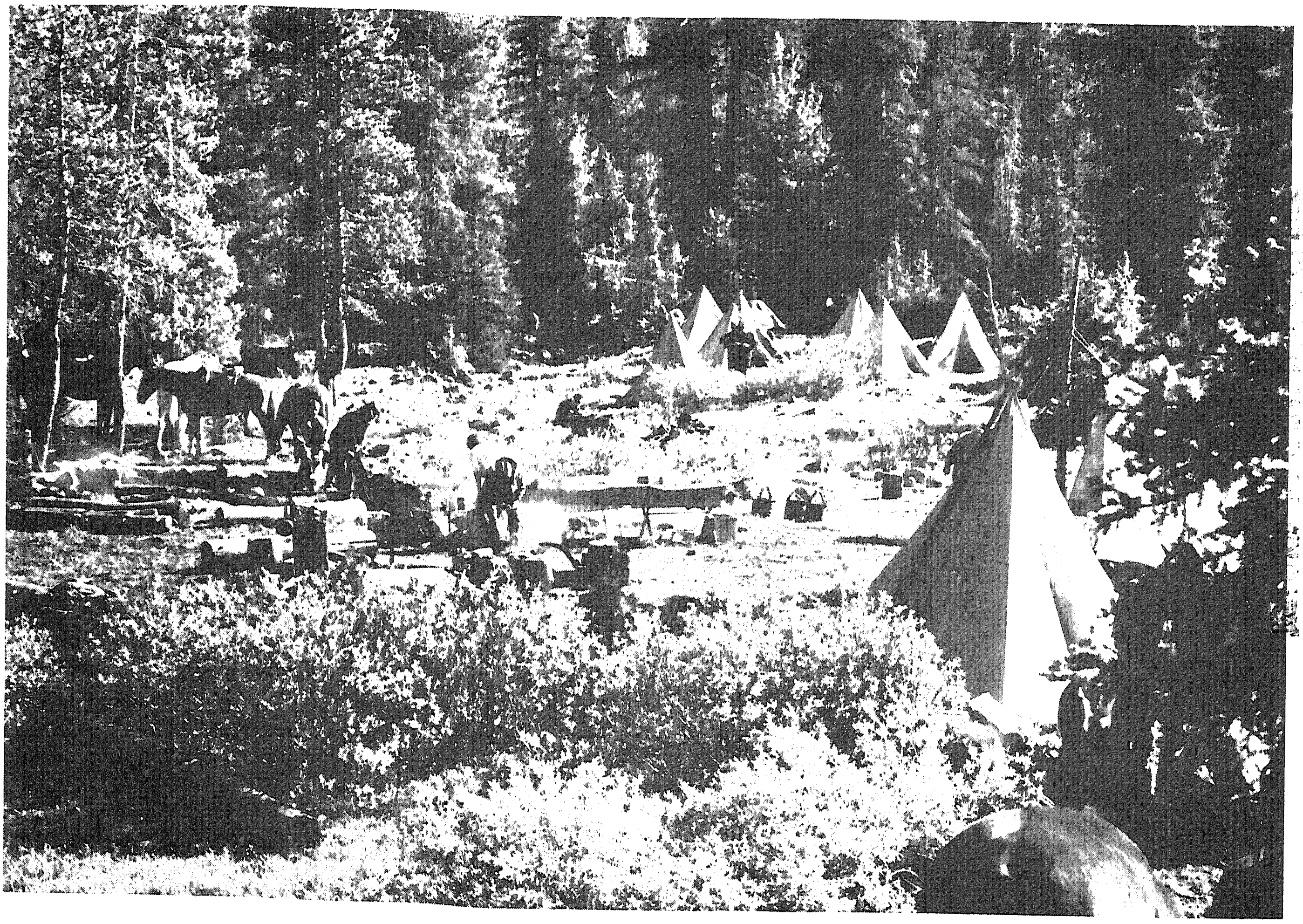
**Intermountain
Forest and Range
Experiment Station
Ogden, UT 84401**

Research Paper
INT-302

February 1983

Monitoring the Condition of Wilderness Campsites

David N. Cole



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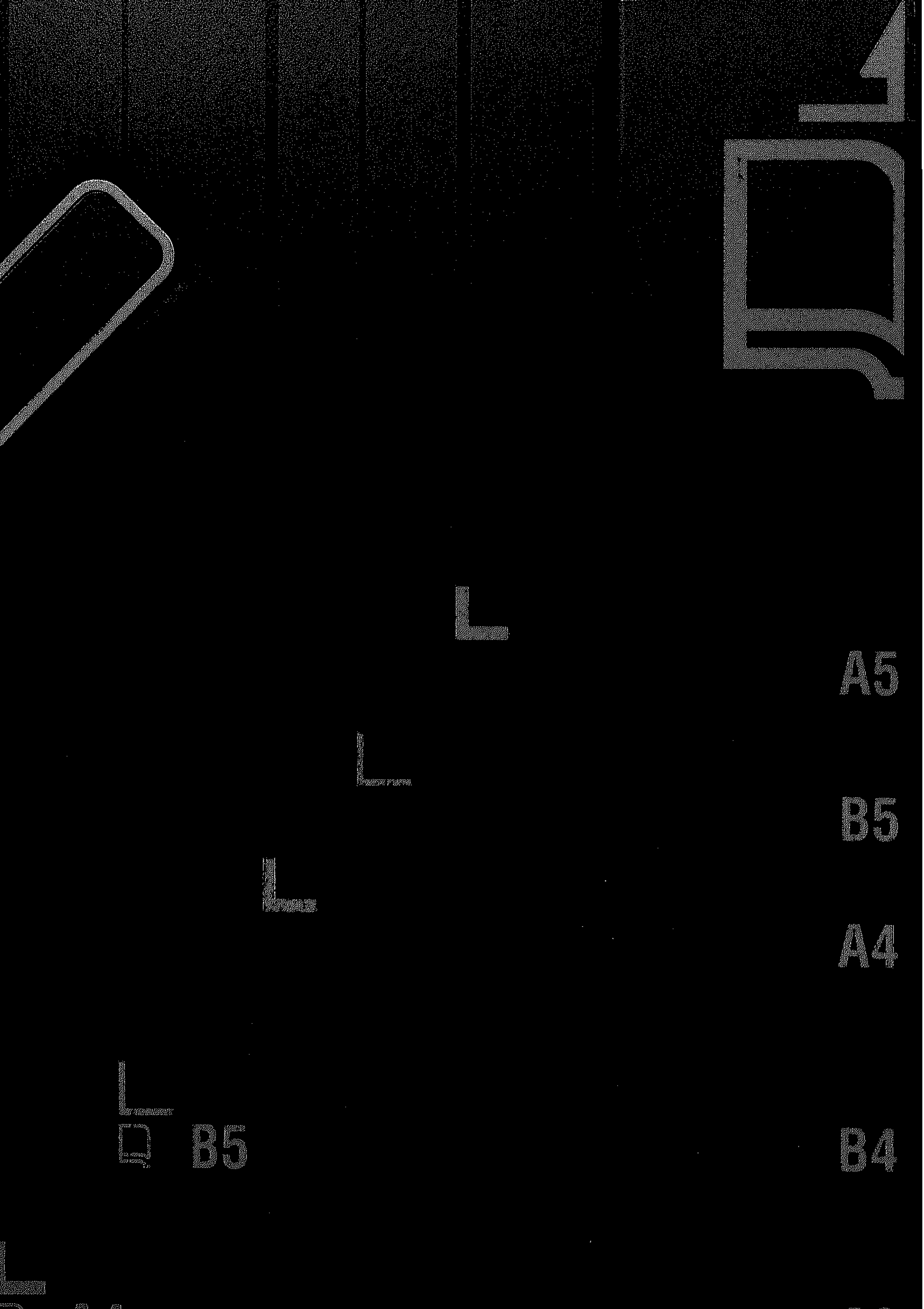
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THE AUTHOR

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RESEARCH SUMMARY

Information on the distribution and severity of wilderness campsite impacts is necessary for planning purposes. Monitoring of campsite conditions will also allow managers to evaluate change in campsite condition and how such changes relate to management actions. Existing campsite monitoring systems are based on visual estimates of impact, measurements of impact, or photographs. The most useful systems (1) evaluate a number of meaningful parameters, (2) record each of these parameters separately, and (3) use as precise techniques as management can afford and still be able to inventory all sites. Estimation techniques will probably have to be used in most wilderness areas where funds are short and campsites are numerous. Suggestions for how to develop such a system are provided. Keys to success include adequate training so techniques are used in a consistent manner, quantitative category definitions, and documenting site locations so they can be reassessed in the future.

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INTRODUCTION

Recreational use of wilderness and backcountry areas inevitably leaves an imprint on natural environments intended for preservation. Wilderness use affects trails, meadows, and lakeshores, but impacts are usually most pronounced on campsites. Where wilderness managers have judged that impacts exceeded acceptable levels, they have often taken such actions as closing severely deteriorated sites, diverting campers to less-used areas, or confining use to designated sites. Too often these actions are taken without the benefit of comprehensive campsite condition data. Consequently, it has been impossible to evaluate the effects of these actions on either impacted sites or adjacent areas which are currently undamaged.

In recent years, managers have been under pressure to improve the sophistication and accountability of wilderness management. Regulations in the National Forest Management Act of 1978 specifically require Forest Service wilderness managers to limit and distribute visitor use in such a way that natural conditions are largely unimpaired and to monitor the response of the wilderness resource to these actions. Much of this effort must be focused on campsites, the places that are most severely altered by recreational use and among which visitor use may have to be limited and distributed.

Unfortunately, funding for the collection of data needed for wilderness management is sorely lacking compared to funding available for collecting data used in the management of other resources, such as timber. Access to most wilderness acreage is poor; motor vehicles are not allowed and many remote areas are not even penetrated by trails. Moreover, many areas have thousands of sites that must be inventoried.

This paper discusses desirable characteristics of a backcountry campsite inventory and monitoring system, evaluates existing methods, and provides suggestions for developing a system that builds on the strong points of existing techniques.

DESIRABLE CHARACTERISTICS

A campsite monitoring system should provide accurate and meaningful information about changes that have already occurred on campsites. This tells the manager how widespread and severe recreational impacts have been and, therefore, how much of a problem exists. It should also provide a baseline for subsequent monitoring of conditions so that trends can be evaluated.

A good system will have four characteristics: (1) meaningful measures of impact are utilized; (2) measurement techniques are reliable and sensitive; (3) costs are not too high to prohibit an inventory of all sites; and (4) measurement units can be precisely relocated.

The value of the information collected will depend on how carefully variables are selected. Some variables provide a measure of current campsite condition, but no measure of how much change has occurred. For example, the vegetation cover of a campsite is not a measure of impact. It is so highly variable under natural conditions that it must be compared to an estimate of the original cover on the site before it provides a meaningful measure of change.

Variables selected for use also need to be applicable to sites that have received radically different types or amounts of use and sites in different environmental settings. Similar ratings, even in very different situations, should reflect similar amounts of change. This can be achieved most effectively by collecting information on a number of different parameters.

Although it may sometimes be desirable to aggregate these parameters in a single measure of site condition, important information will be lost if the data cannot be disaggregated as well. The ability to evaluate change in individual parameters, such as size of the campsite, is particularly valuable to a monitoring program. Disaggregation also allows managers the flexibility of changing their minds about the relative importance of any given measure of campsite condition.

The second characteristic is reliability; assessment techniques must be sufficiently precise to allow independent observers to reach similar conclusions about site condition. This depends on precise explanation of techniques and consistent training of evaluators. Assessment techniques must also be sensitive enough to detect managerially relevant differences between sites and changes over time.

Managers must always make a tradeoff between reliability/sensitivity and cost. More precise techniques take more time and this may become prohibitive if sites are numerous. Assuming the primary objective is to characterize the distribution of impacted sites and be able to detect major changes, managers would do best to use as precise techniques as they can afford and still be able to inventory all sites. It might also be desirable, however, to take more precise measurements on a subsample of campsites. This practice would allow managers to detect more subtle changes and to more accurately relate such changes to use levels, environmental conditions, or other variables that might affect amount of impact. For example, such measurements have been taken in Sequoia and Kings Canyon National Parks and in Great Smoky Mountains National Park (Bratton and others 1978).

Finally, in order to monitor changes over time, it is important to document the exact location of the areal unit on which the original measurements were taken. This might be the entire campsite, square plots, line transects, or any other sampling unit.

EVALUATION OF EXISTING SYSTEMS

Perhaps the most widely used campsite inventory system is the Code-A-Site system originally proposed by Hendee and others (1976). Important information about each site is recorded on edgepunch cards, which facilitate data retrieval and manipulation. It is the method of collecting and storing information rather than the type of information collected that is unique to this system. In fact, much of the information on the Code-A-Site form is irrelevant in backcountry. Several managers have modified the cards, however, to more adequately achieve their data needs. In Olympic National Park, the edgepunch cards have been completely reprinted with different types of information (Schreiner and Moorhead 1979). Managers of the Selway-Bitterroot Wilderness merely developed an overlay, with more relevant information to use with the original cards developed by Hendee's group. Campsite condition data—my specific concern in this paper—can be stored on Code-A-Site forms or in any other convenient manner.

Most existing campsite monitoring systems fall into one of three basic types. In one type, campsites are given a single condition rating which is usually based on visual estimates of impact. In other systems, a number of measurements are taken, each of which can be repeated and used as a separate measure of change. Photographic techniques are the basis of other systems.

Estimates of General Condition

The original Code-A-Site form (Hendee and others 1976) only asks for a judgment of whether the impact of previous use has been extreme, heavy, moderate, or light. These terms are not defined. Consequently, it is impossible to compare the condition of sites rated by different people or to accurately assess changes on the site at a later date; the system lacks the characteristic of reliability or precision.

This problem can be alleviated by defining different levels impact. Frissell (1978) developed a method of rating campsit condition that recognizes the following condition classes: (1) "Ground vegetation flattened but not permanently injur Minimal physical change except for possibly a simple rock fireplace"; (2) "Ground vegetation worn away around firepl or center of activity"; (3) "Ground vegetation lost on most c the site, but humus and litter still present in all but a few areas"; (4) "Bare mineral soil widespread. Tree roots expose on the surface"; and (5) "Soil erosion obvious. Trees reduce in vigor or dead" (fig. 1a and b). One of the Code-A-Site mo ifications made by managers of the Selway-Bitterroot Wilderness was to define extreme, heavy, moderate, and light levels impact on the basis of these same easily recognized indicators of change.

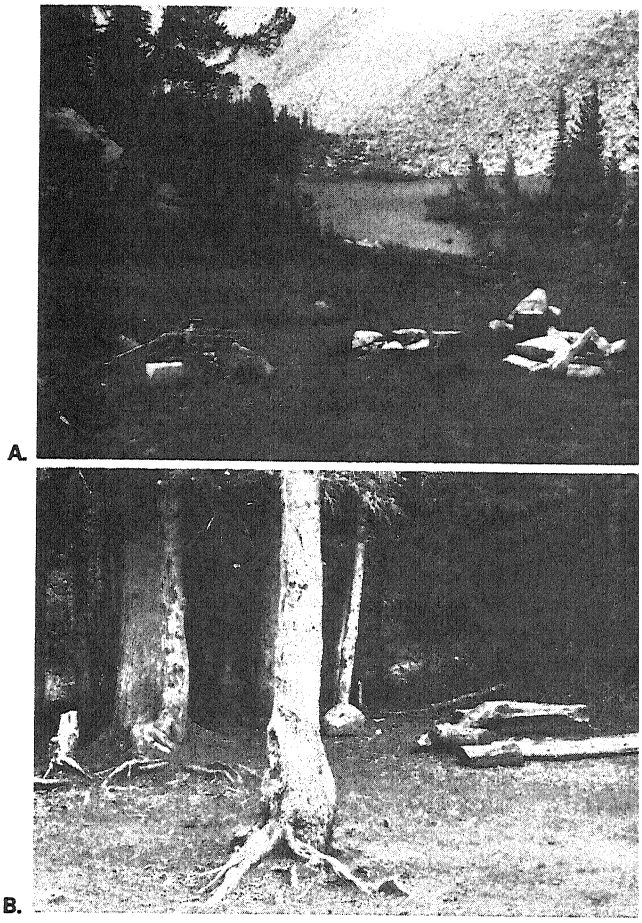


Figure 1.—Examples of campsites with condition class ratings of (A)2 and (B) 4 (Frissell 1978).

Either of these "condition class" systems provides the manager with a rapid, inexpensive technique for rating campsites and the data generated is relatively precise. Although the use of quick visual estimates of parameters, such as bare ground, is less precise than more time-consuming measuremen techniques, the ratings of trained independent observers can b sufficiently consistent and sensitive to make reliable comparisons of campsite condition possible.

The few parameters chosen by Frissell provide a useful summary measure of campsite condition for the landscapes in which the system was developed—coniferous forests in cool climates, where litter accumulation is great, growing seasons a short, and ground vegetation is highly sensitive to disturbance.

In many other environments, however, such as alpine fell-fields or grasslands, the system does not work well. Where there are no trees, ratings must be based on only one or two parameters. Moreover, the significance of the changes associated with a condition such as "ground vegetation lost on most of the site" is not equivalent in such diverse vegetation types as the sparse undergrowth of coniferous forests and alpine turf communities, where recovery of damaged vegetation may take centuries (Willard and Marr 1971).

This problem was substantially alleviated in a system developed for use in Sequoia and Kings Canyon National Parks (Parsons and MacLeod 1980). This system is also based on rapid estimates of easily recognized indicators of change, but eight separate parameters are used: vegetation density, vegetation composition, campsite area, area of the barren core, campsite development, presence of organic litter and duff, number of access (social) trails, and number of tree mutilations. The mean value for all the ratings that apply to the site—number of tree mutilations, for example, is not applied to nonforested sites—becomes the campsite rating. Even if a couple of parameters cannot be applied to the site, the rating should still be valid because it is based on a large number of other parameters.

The major problem with this system is that after evaluators become experienced, only the site's overall condition rating is recorded; individual parameters are only noted on a subsample of sites. Consequently, disaggregation of the data is impossible. It will not be possible to evaluate future changes in individual parameters, such as campsite area or degree of development. Perhaps more importantly, wilderness managers are locked into the current system of weighting each of the eight parameters equally. If each parameter had been recorded separately, managers at a later date could delete parameters they considered unimportant or change the weighting system without reevaluating each site.

The reason data were aggregated in Sequoia and Kings Canyon National Parks was that there were too many campsites to take the time or storage space to fill out a separate form for each site. Over 7,400 campsites have been inventoried in the two Parks (Parsons and MacLeod 1980). This large number of campsites is uncommon. In the more common situation of fewer campsites, it would be worth the additional cost to record each parameter separately, with a separate form for each site.

Measurements

Several areas use measurements rather than visual estimates. Such systems are more costly—it takes more time to rate each site—but precision is higher (fig. 2). The information contained in such ratings, however, is not necessarily more meaningful. Olympic National Park, for example, rates sites on the basis of bare ground radius, the mean distance to "the first live plant" along eight transects radiating from the campsite center (Schreiner and Moorhead 1979). In the Eagle Cap Wilderness, bare ground radius proved to be a less useful predictor of campsite condition than Frissell's less precise, but more meaningful condition class (Cole 1982).

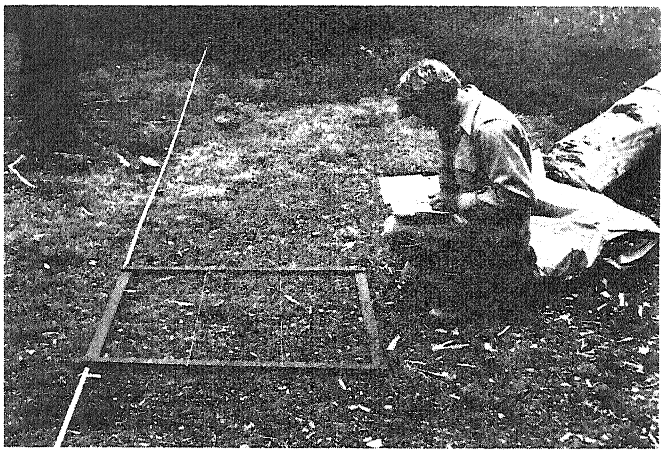


Figure 2.—Worker uses a meter-square quadrat to measure vegetation cover on a wilderness campsite.

This problem can be alleviated by measuring more parameters. In the Olympic National Park system, the number of social trails entering each site and the number of areas trampled by horses are also noted. The managers of Great Smoky Mountains National Park measure the area, on and around each site, of the following "disturbances": bare rock, mud, slope erosion, bare soil, leaf litter, trampled vegetation, firewood clearing, tree damage, and trash dispersal (Bratton and others 1978). In the Selway-Bitterroot Wilderness, tree mutilations are recorded, as is the amount of bare mineral soil, litter-covered soil, and vegetation along each of eight permanent line transects.

Provided that meaningful parameters are measured and appropriate sampling methods are used, measurements are preferable to estimates. They reduce the potential for observer bias and increase sensitivity to the point where even minor differences and changes in condition can be detected. The cost of such a system is high, however, and where there are a large number of campsites, the increased precision may not be worth the expense. Where the number of campsites is low—Great Smoky Mountains National Park, for example, had only 113 legal sites and another 289 illegal sites—measurements might be a worthwhile investment.

It is important that meaningful and comparable evaluations of campsite condition be taken on all existing campsites. This makes it possible to detect the development of new campsites and to evaluate changes in the condition of more lightly impacted sites. The ability to evaluate change on these more lightly impacted sites is of crucial importance because both the uncertainty of what is happening to these sites and the potential for change are so much greater here than on more heavily impacted sites. If funding is insufficient to take measurements on all sites, it would be better to use an estimate system on all sites than to only take measurements on some of the sites.

Photographs

A number of areas have made replicable photopoints the basis of their monitoring system. In a system used in the Selway-Bitterroot Wilderness, 360°-panorama photo mosaics (fig. 3) are taken from permanent points located near the center of each site (Walker 1968). Photographs have generally not proven to be reliable substitutes for field measurements or estimates of parameters, such as ground cover vegetation or exposed mineral soil. Patches of sunlight and shade often make interpretation of the ground cover difficult, and it is seldom possible to distinguish features beyond the closest trees. As supplementary documentation they can be quite useful, however. They can help identify the site for future reassessments, record campsite features not measured in the field, and provide a visual supplement to the data collected in the field.

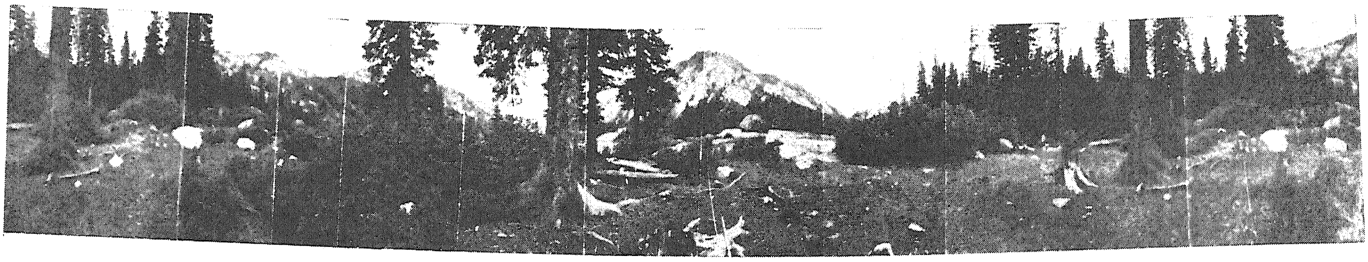


Figure 3.—Panorama photo mosaics have been used in the Selway-Bitterroot Wilderness.

RECOMMENDATIONS

From the preceding discussion, the most useful campsite inventory and monitoring system appears to be one that (1) evaluates a number of meaningful parameters, (2) records each of these parameters separately, and (3) uses as precise techniques as management can afford and still be able to inventory all sites.

Choosing the Precision Level

This choice must be made primarily on the basis of available funding and the number of campsites. The frequency of periodic reassessments of the sites should also be considered.

Where the number of campsites is low and/or funding is high, precise measurement techniques utilizing such sampling units as permanent quadrats, belt transects, or line transects can be afforded and are preferred. Measurements taken on a subsample of sites might also provide a useful supplement to an estimation system in areas which cannot afford to take measurements on all sites.

In most areas a measurement system, which usually involves spending an hour or more on each site, is too time-consuming and costly. In this case, visual estimates can be used in place of measurements. Precision and sensitivity are reduced but the resulting ratings should be adequate to meet most management needs, if each parameter is independently recorded. Using such a system, the amount of time spent on each site could be less than 10 minutes.

Finally, if there are so many campsites in an area that even 10 minutes per site is too much, campsites can be given a single aggregate rating. As mentioned above, this severely limits flexibility in the future use of the data. In the system in use at Sequoia and Kings Canyon National Parks, a couple of minutes per site is all that is necessary.

Choosing Parameters

Managers should choose parameters that reflect unique types of impact occurring in the area they administer. Types of impact that are most likely to conflict with management objectives should be given high priority. In general, the types of impact that occur on campsites do not differ greatly from place to place. Many of the same parameters are used by Parsons and MacLeod (1980) in California, by Frissell (1978) in Minnesota and Montana, and by Schreiner and Moorhead (1979) in Washington. Most other areas will probably also find these same parameters to be a useful list of possibilities.

Based on work in a number of wilderness areas, but particularly in the Eagle Cap Wilderness in Oregon, I have developed a campsite monitoring system that incorporates many of these same parameters. The system uses visual estimates on the assumption that this type will be most useful in most areas. The following discussion describes suggested estimation techniques for each parameter. While these estimation techniques should be widely applicable, class definitions, which are also included, should vary greatly from place to place.

For example, I recently used this system in the Bob Marshall Wilderness in Montana, an area that receives heavy horse and outfitter use and which, in many locations, has few potential campsites. As a result of this type of use, most sites, when compared to those in the Eagle Cap Wilderness, are large, littered with horse manure, and have experienced severe tree damage and root exposure. Consequently, almost all sites received the worst ratings for camp area, cleanliness, damage to trees, and exposure of tree roots. Despite identical ratings, some of these sites were much worse than others. In order to provide ratings that identify the most severely impacted sites, I developed class definitions that were less stringent than those used in the Eagle Cap Wilderness. In like manner, managers of most areas should adapt the class definitions suggested in this paper to their unique situation.

CONDITION OF GROUND COVER VEGETATION

Loss of ground cover is one of the most pronounced changes that occurs on campsites. It is a prominent, early indicator of campsite condition in most systems that have been devised. Estimates of percent cover are not useful in themselves because there is so much variability in the cover of undisturbed sites. Some system of relating campsite vegetation to that of the surroundings is needed.

My recommendation is to estimate the percent cover of campsite vegetation in one of the following coverage classes: 0 to 5 percent, 6 to 25 percent, 26 to 50 percent, 51 to 75 percent, and 76 to 100 percent. With time and training this can be done consistently. It may be helpful to walk around the site and mentally average cover in different parts of the site. In cases where it is extremely difficult to choose between classes, make your best guess and then note the classes it was difficult to choose between. Make a similar estimate of the percent cover of the vegetation surrounding the site, keeping in mind that you are attempting to estimate what the cover of the site was before it was used as a campsite. This involves looking closely at places that are similar to the campsite in terms of rockiness, slope, canopy cover, and species composition, and looking at the vegetation in places protected from trampling. While this estimate is seldom simple to make, it can be done with practice.

Comparison of these two coverage class estimates can be used to give each site a rating from 1 (least impact) to 3 (most impact). A campsite with a vegetation cover that is two or more coverage classes less dense than that found offsite is assigned a rating of 3. For example, if the vegetation cover is 51 to 75 percent offsite and 6 to 25 percent onsite (two coverage classes less dense), the campsite will receive a rating of 3. Vegetation loss equivalent to one class is assigned a 2, and no loss is assigned a 1 (fig. 4).

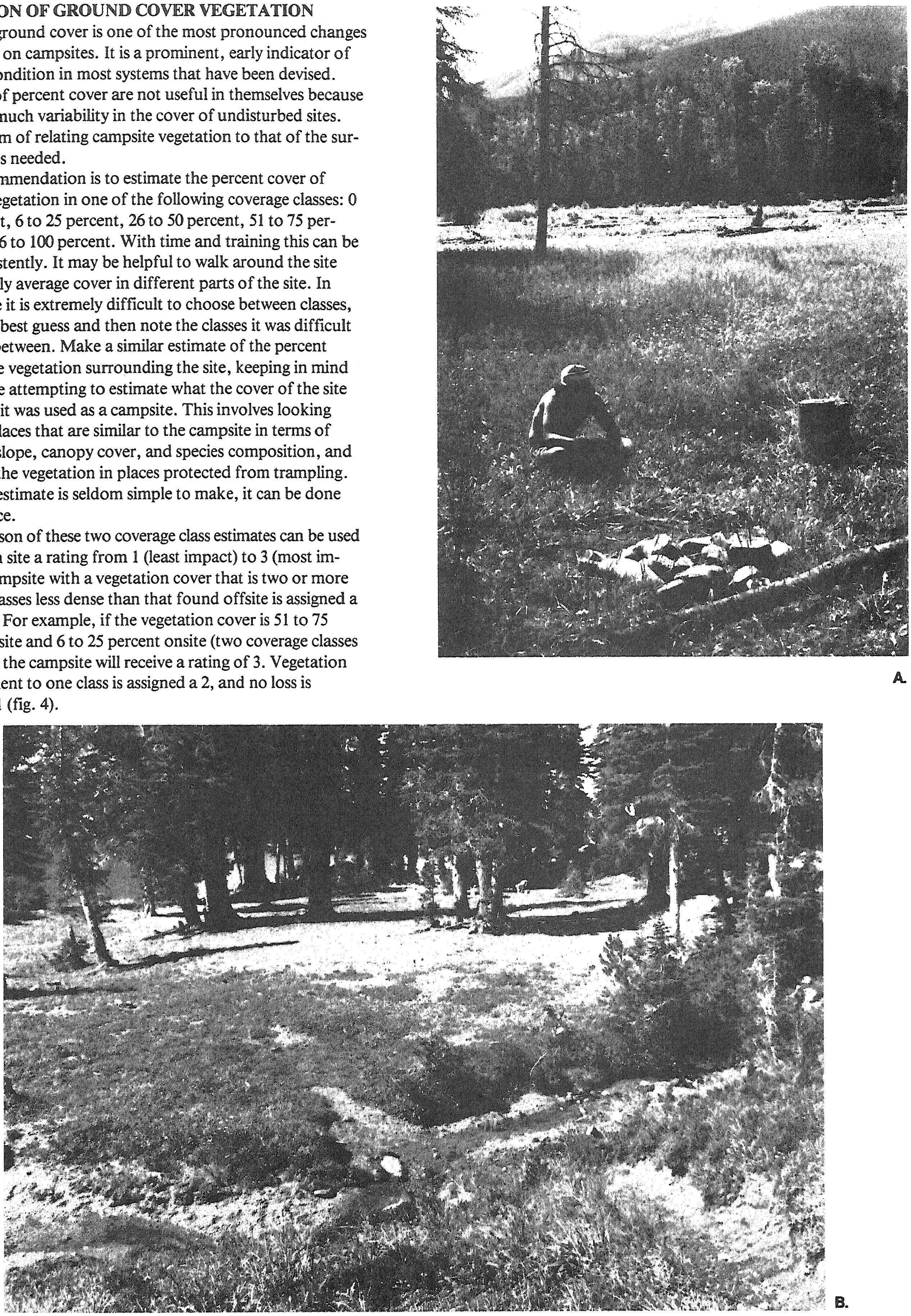


Figure 4.—Examples of campsites with vegetation loss ratings of (A) 1 and (B) 3.

A measure of change in species composition would also be useful. This requires considerable judgment and training, however, and is particularly difficult to assess on campsites where essentially all vegetation has been lost. The Sequoia and Kings Canyon National Parks system utilizes this parameter, considering it to be inapplicable if the site has been totally devegetated. This can lead to worse ratings for a site with some highly dissimilar vegetation left than would be given to a completely denuded site. It might be better to merely note whether or not the vegetation left consists primarily of weedy invaders.

EXPOSURE OF BARE MINERAL SOIL

Recent studies have shown that the amount of mineral soil exposed on a site increases dramatically on more heavily used sites (Fichtler 1980; Cole 1982). Therefore, soil exposure is a particularly good indicator of campsite condition. As with the preceding parameter, it is possible to estimate coverage in the five coverage classes, both on the campsite and in a neighboring area. The vegetation and bare soil estimates can be made simultaneously. The same rating system can be used as well.

Bare mineral soil is more difficult to estimate than vegetation because there is usually a continuous gradation from twigs, leaves, and needles, through partially decomposed and decomposed litter to mineral soil. Moreover, on many campsites heavy trampling has arranged these materials in a highly intricate mosaic of litter and exposed soil. Where litter layers are thin and have obviously been displaced by recreational use, my estimates of bare soil have been high. Elsewhere I have been more conservative. Training and calibration of observers is particularly important with this parameter.

DAMAGE TO TREES

Trees on and adjacent to campsites frequently have had their lower branches broken, their boles hacked, and nails driven into them. In many cases, smaller trees have been cut down for firewood or tent poles. Standing snags have also been hacked and cut.

On sites which have trees either onsite or at their periphery, it is possible to rate this damage. The main problem is defining classes. Three classes can be defined as follows: (1) no more damage than some broken lower branches; (2) between one and seven tree mutilations (ax marks, scars, carvings, nails, cut stumps, and so on), no more than one of which is obtrusive; and (3) more than seven tree mutilations or more than one obtrusive mutilation. More than one mutilation can occur on a tree. Less stringent class definitions were necessary in the Bob Marshall Wilderness, where tree damage was severe. For comparative purposes at a later date, it is important to include brief notes on the size and location of the area to be reexamined and on the amount of different types of damage.

EXPOSURE OF TREE ROOTS

The number of trees with exposed roots has been found to increase along with amount of use as a result of soil compaction and erosion (Cole 1982). Root exposure is particularly pronounced on sites used by horse parties due to the practice of tying horses to trees.

This parameter, again, is only applicable to sites with trees onsite or at their periphery, and defining classes is difficult. I defined three classes as follows: (1) no trees with root exposure; (2) root exposure occurs, but on no more than three trees; and (3) root exposure on more than three trees (fig. 5). It is important to distinguish between natural root exposure in shallow soils and exposure of roots resulting from trampling. Training will lead to consistent judgments, and supplemental notes will facilitate future assessments of change.

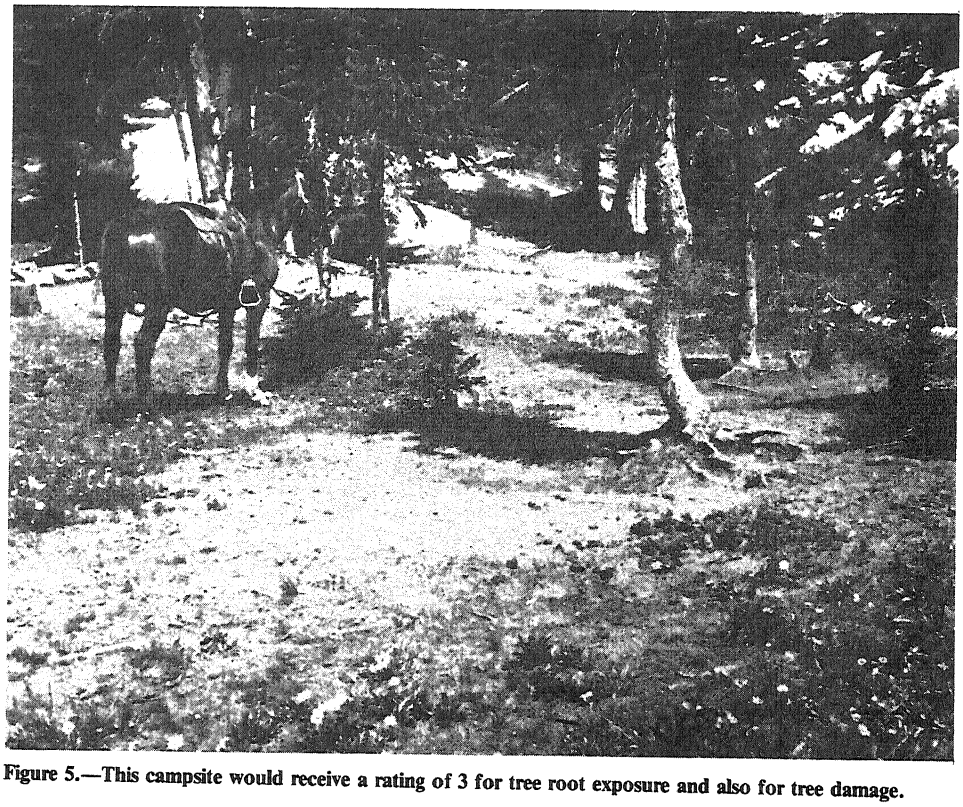


Figure 5.—This campsite would receive a rating of 3 for tree root exposure and also for tree damage.

EXTENT OF DEVELOPMENT

Developments include fire rings, log or stone seats and tables, windbreaks, leveled tent pads, and other human constructions. Both the number of developments and their obtrusiveness need to be considered. While not indicative of ecological change, the number of developments provide information as to how noticeable the "imprint of man" has been. In contrast to the preceding four parameters, the extent of development can be rapidly changed in either direction by managers or visitors.

I defined the following three classes: (1) nothing more than a scattered fire ring; (2) nothing more than one existing fire ring and crude log or stone seats; and (3) either more than one existing fire ring or well-developed seats, tables, windbreaks, leveled tent pads, or other developments (fig. 6). Make notes about the developments that led to your ranking of the site.

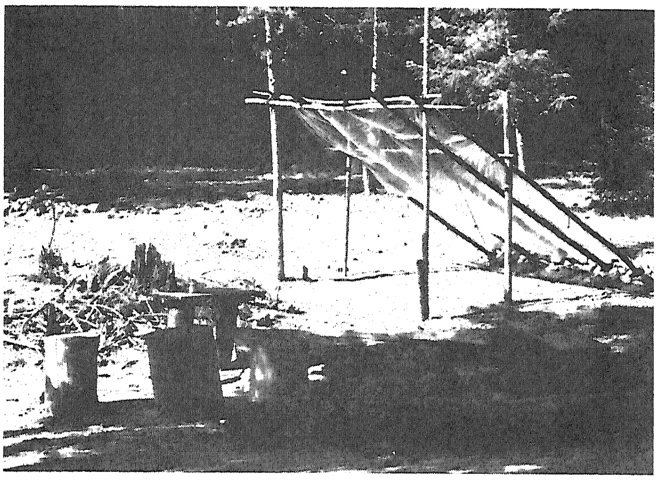


Figure 6.—This campsite would receive a rating of 3 for development.

CLEANLINESS OF THE SITE

This measure, like the preceding one, is not an ecological change and is subject to rapid change. In Yosemite National Park, however, Lee (1975) found that extent of development and cleanliness were the most critical variables affecting the visitor's enjoyment of the site. Included here is the amount of charcoal, blackened logs, other remnants of campfires, litter, toilet paper, human waste, and horse manure scattered around the site.

Three classes can be defined as follows: (1) nothing more than scattered charcoal from one fire site; (2) either scattered remnants of more than one fire site or some litter or blackened logs; and (3) any horse manure, human waste, or toilet paper, or widespread litter, blackened logs, or other remnants of campfires. Include notes with your ratings.

TOTAL AREA OF THE CAMPSITE

This parameter can be measured with tape measure or by pacing. If the site is roughly circular, it is easiest to measure an average radius and use the formula for the area of a circle. If the site is more rectangular, the product of average length and width measurements is more appropriate. With training, it should quickly become easy to estimate area without resorting to measurements. Include any satellite tent pads in your estimate.

More difficulty arises in defining the edge of the site, which can usually be recognized by a contrast between trampled and untrampled vegetation. Trampled vegetation becomes a less useful criterion of the campsite as either the amount of use or the susceptibility of the vegetation to trampling damage decreases. In areas with fragile vegetation, such as tall forbs or shrubs, I have generally assumed that lack of apparent trampling damage is a result of low levels of trampling; consequently, I have assigned these sites to the smallest size class. On more resistant vegetation types, such as those dominated by graminoids or small forbs, or on sparsely vegetated sites, trampling stress may be great but not readily apparent. For example, many high elevation sedge meadows, such as those dominated by *Carex nigricans* (black alpine sedge) or *C. exserta* (shorthair sedge) are used often, but damage is not apparent and it is not possible to distinguish the edge of the site. In these cases, I have considered the areal measure inapplicable.

I defined three classes as: (1) 0 to 50 m^2 (0 to 538 ft^2); (2) 51 to 100 m^2 (539 to 1,076 ft^2); and (3) greater than 100 m^2 (1,076 ft^2).

AREA OF THE BARREN CORE

As the central core of the campsite (usually the area around the fire ring) absorbs an inordinate amount of use, the vegetation in the vicinity is often eliminated. This creates a central barren core that grades into increasingly dense remnants of vegetation with distance from the center. Schreiner and Moorhead (1979) have shown the value of an areal estimate of this barren core in their work in Olympic National Park. Consistent definition of the edge of the bare area comes with training and calibration of observers.

I defined three classes as: (1) 0 to 5 m^2 (0 to 54 ft^2); (2) 6 to 50 m^2 (55 to 538 ft^2); and (3) greater than 50 m^2 (538 ft^2).

ACCESS TRAILS

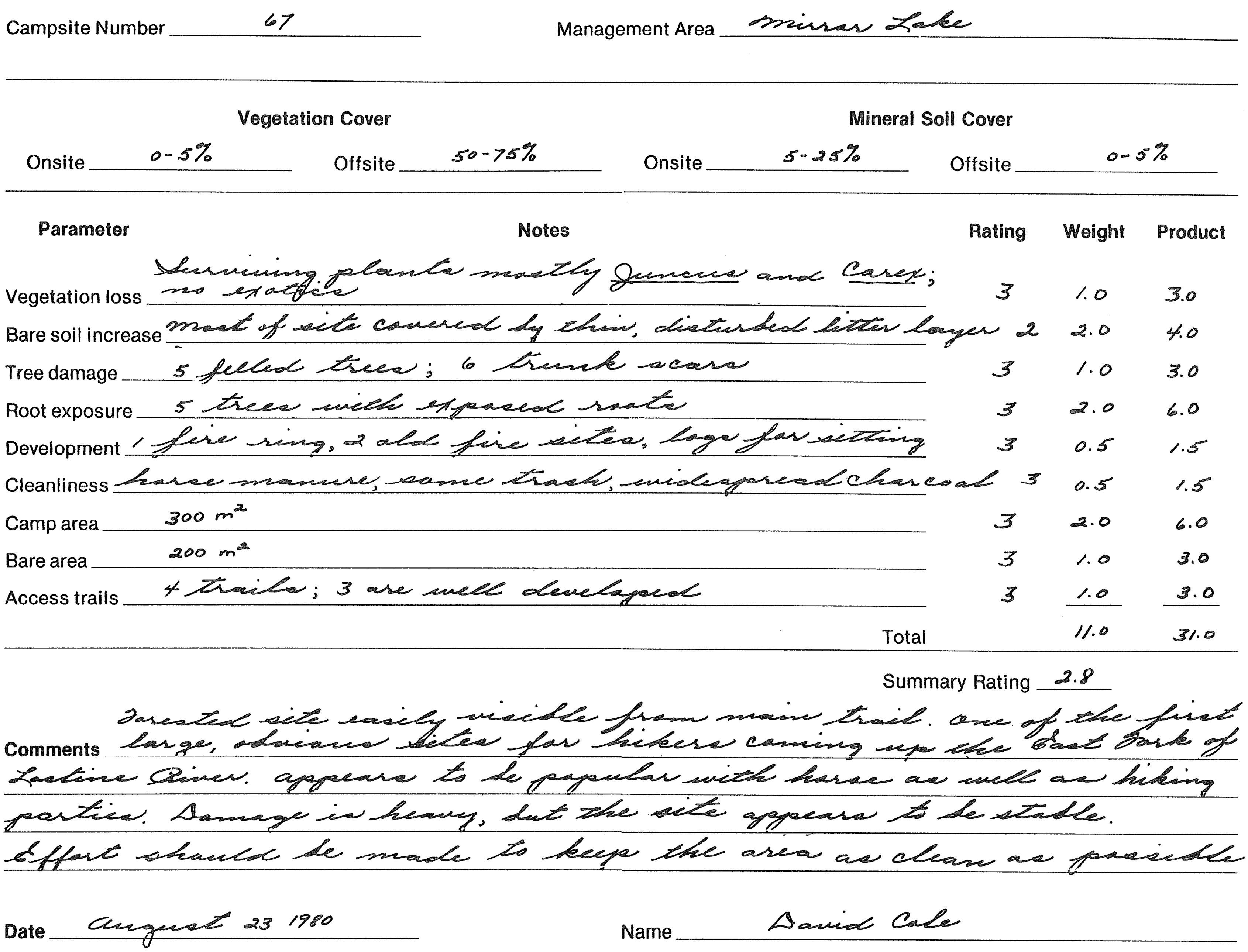
Many campsites have a system of access trails that lead from the campsite to water sources, main trails, or neighboring campsites. Both the number of trails and the degree of development are of concern.

I defined three classes as follows: (1) no trails discernible; (2) one or two discernible trails, but no more than one well-developed trail; and (3) either more than two discernible trails or more than one well-developed trail.

Summary Ratings

It is possible, and usually desirable, to aggregate these individual ratings into a summary rating of campsite condition. The easiest method is to weight each parameter equally; the summary rating is then the mean value of all the parameters applicable to the site. This implies that each of these types of change is of equal importance. It is more realistic, however, to evaluate the relative importance of each parameter used and weight the parameters accordingly. For example, managers might decide that bare soil, root exposure, and camp area should be given a double rating, while development and cleanliness should be given only one-half the importance of the other parameters. Individual ratings should then be multiplied by the appropriate weighting factors; these products should be summed; and this total should be divided by the sum of the weighting factors (fig. 7).

The data can be disaggregated at a later date if managers decide on a new set of priorities. Different weighting factors can be assigned and new ratings can be calculated.



Campsite Number 67

Management Area Mirror Lake

Vegetation Cover

Onsite 0-5%

Offsite 50-75%

Mineral Soil Cover

Onsite 5-25%

Offsite 0-5%

Parameter	**Notes**	**Rating**	**Weight**	**Product**
Vegetation loss	Surviving plants mostly Juncus and Carex; no exotics	3	1.0	3.0
Bare soil increase	most of site covered by thin, disturbed litter layer	2	2.0	4.0
Tree damage	5 felled trees; 6 trunk scars	3	1.0	3.0
Root exposure	5 trees with exposed roots	3	2.0	6.0
Development	1 fire ring, 2 old fire sites, logs for sitting	3	0.5	1.5
Cleanliness	horse manure, some trash, widespread charcoal	3	0.5	1.5
Camp area	300 m^2	3	2.0	6.0
Bare area	200 m^2	3	1.0	3.0
Access trails	4 trails; 3 are well developed	3	1.0	3.0
		Total	11.0	31.0

Summary Rating 2.8

Comments Forested site easily visible from main trail. One of the first large, obvious sites for hikers coming up the East Fork of Lostine River. Appears to be popular with horse as well as hiking parties. Damage is heavy, but the site appears to be stable. Effort should be made to keep the area as clean as possible

Date August 23 1980

Name David Cole

Figure 7.—Possible format for data collection form.

Photographs

A few photographs of the entire site and selected features will provide a useful supplement to field measurements. To be most useful, at least one photograph should include some feature of the campsite or its vicinity which can aid in relocating the site. When photographing forested sites, make use of cloud cover whenever possible, as patches of shade and sunlight make interpretation of the ground cover difficult. Moderately fast (high ASA) color print film is useful for most purposes. Color film is more sensitive to differences in ground cover than black and white, and prints, although bulkier than slides, are easier to refer to both in the field and in the office. Color film may tend to fade with age, however, suggesting that use of some black and white film may be desirable for long-term comparisons.

The time of year and time of day should be noted on all photographs. If photographs taken in subsequent years are to be compared with any precision, it will also be necessary to record the precise location of the photopoint, distance and direction to subject, height of the camera above the ground, camera make and model, focal length of the lens, filter type, and film type. These conditions should be replicated to as great an extent as possible when subsequent photographs are taken. Reference as to whether the year has been unusually wet or dry, or whether snowmelt was late or early may also be important.

Future Reassessments

Periodically—perhaps every 5 years—all of these sites should be reexamined. Difficulties in relocating sites can be reduced if each site is located on a map or with a pinprick on an aerial photograph, and if a reference photo of each site is taken into the field. It is also important to document on maps or aerial photographs all areas that were and were not thoroughly searched for campsites. When additional sites are found, this will indicate whether these sites are new or were just missed in the earlier inventory.

USE OF CAMPSITE CONDITION DATA

Data on the condition of campsites provides information on the number of sites, their condition, and distribution. This forms a basis for evaluating the "acceptability" of current conditions and for developing management strategies and programs. It also serves as a baseline for a monitoring program.

To determine whether current campsite conditions are "acceptable" or not requires the definition of standards or "limits of acceptable change" (Frissell and Stankey 1972). These are statements of the maximum amount of change in conditions considered to be appropriate. For example, managers might state that no campsites will be larger than 1,000 ft^2 or no campsites will have a summary rating of more than 2.5. Then, by examining the inventory data, it will be possible to tell if current conditions meet these standards. If they do not, mitigating actions will be necessary.

The value of this approach is that it provides a coherent, logical basis for management that can be explained to visitors. It also provides a definition, in the form of standards, of the wilderness setting and experience the manager is trying to provide. This approach makes it clear when a management response is or is not needed and the success of that response can be judged by whether conditions become acceptable in the future or not.

At this time (1981), few areas have developed formal standards. Consequently, it is not possible to evaluate the acceptability of current conditions. The data can, however, be used to document current conditions and to identify both the extent or areal spread of campsite impacts and sites where impacts are particularly severe. This will help in the development of management priorities, whether attention is given to the preservation of portions of the area that have not been highly disturbed or to the rehabilitation of particularly severe problem areas.

This information will become increasingly valuable with time. If campsites can be relocated and reassessed in a manner consistent with the original assessment, it will be possible to identify trends in condition, of the whole area and of individual sites, and to relate these trends to changes in use characteristics and management actions. Having rated condition parameters separately, it will be possible to distinguish improvement in some parameters from deterioration in others. Such information should lead to an ever-increasing ability to meet management objectives established for backcountry campsites.

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Managers need information on the distribution and condition of wilderness campsites and how this pattern of impact is changing over time. This paper discusses desirable characteristics of a wilderness campsite impact monitoring system, evaluates existing methods, and provides suggestions for developing a system that builds on the strong points of existing techniques.

KEYWORDS: monitoring, campsite, backcountry management, wilderness, ecological impact

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